10th Class 2014

Biology	Group-II	Paper-II
Time: 2.45 Hours	(Subjective Type)	Max. Marks: 63

Part-I

2. Write short answers to any Six (6) questions: 12

(i) What is Larynx? Write its function.

Ans The larynx is a box, made of cartilage. It is present between pharynx and trachea. It is also called the voice box. Two pairs of fibrous bands called vocal cords are stretched across the larynx. The vocal cords vibrate when the air passes through them. This vibration produces sounds.

(ii) Write two bad effects of Smoking.

Ans Cigarette smoke affects the body from head to toe. Smokers have a much higher risk of developing a number of life threatening diseases.

Smoking may also lead to the cancers in kidneys, oral cavity, larynx, breast, bladder and pancreas, etc. Many chemicals in tobacco smoke damage the air passageway, which leads to emphysema and other respiratory disorders.

(iii) What are the symptoms of Bronchitis?

Ans Symptoms of bronchitis include a cough, mild wheezing, fever, chills and shortness of breath (especially when doing hard job).

(iv) Define Osmoregulation.

Ans **Osmoregulation** is defined as the regulation of the concentration of water and salts in blood and other body fluids. Kidneys play important role in osmoregulation by regulating the water contents of blood. It is an important process as excessive loss of water concentrates the body fluids whereas excess intake of water dilutes them.

(v) What are Halophytes?

Ans **Halophytes** live in sea waters and are adapted to salty environments. Salts enter in the bodies of such plants due to their higher concentration in sea water. On the other hand, water tends to move out of their cells into the hypertonic sea water. Many sea grasses are included in this group of plants.

(vi) What is Lithotripsy?

Ans **Lithotripsy** is another method for the removal of kidney stones. In this method, non-electrical shock waves from outside are bombarded on the stones in the urinary system. Waves hit the dense stones and break them. Stones become sand-like and are passed through urine.

(vii) Define Reflex Action with example.

Ans When impulses are not passed to the higher centres of brain, it results in responses which are not under conscious control. Such responses are called involuntary actions. Sometimes, the involuntary response produced by the CNS is very quick. Such a response is called reflex action.

The most common example of reflex action is the withdrawal of hand after touching a hot object. In this reflex action, spinal cord acts as coordinator. Heat stimulates temperature and pain receptors in skin. A nerve impulse is generated which is carried by sensory neurons to the interneurons of spinal cord. From interneurons, the impulse is passed to motor neutrons, which carry it to the muscles of arm. As a result, the muscles contract to withdraw hand. During it, other interneurons transmit nerve impulses up to brain so that the person becomes aware of pain and what happened.

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(viii) What is Vitreous Humour?

Ans The iris divides the cavity of eye into two chambers.

"The posterior chamber contains a jelly-like fluid known as vitreous humour."

It helps maintain the shape of eye and suspends the delicate lens.

(ix) What is the cause of Dwarfism?

Ans Somatotrophin (growth hormone) promotes the growth of body. If the production of this hormone is diminished during growing age, the rate of growth decreases. This condition is called **dwarfism.**

3. Write short answers to any Five (5) questions: 10

(i) Write down two disorders along with one reason of each of human Skeletal system.

Ans The following disorders of skeletal system are important:

(a) Osteoporosis:

Osteoporosis is a bone disease in adults, especially in old people. It is more common in old women. In osteoporosis, there is a decrease in the density of bones due to loss of calcium and phosphorus. It may be due to malnutrition (lack of proteins and Vitamin C), lack of physical activities or deficiency of estrogen hormone.

(b) Arthritis:

Arthritis means "inflammation in joints". It is also very common in old age and in women. It is characterised by pain and stiffness in joints (particularly in the weight bearing joints *e.g.,* hip joint, ankle joint, etc.).

(ii) Write down cause of Rheumatoid Arthritis, also give its two symptoms.

Ans **Rheumatoid arthritis:**

It involves the inflammation of the membranes at joints. Its symptoms include fatigue, low-grade fever, pain and stiffness in joints.

(iii) Define Hinge joint and give one example.

Ans Hinge joints move back and forth like the hinge on a door and allow movements in one plane only. The knee & elbow are hinge joints.

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(iv) Define Cloning and Tissue Culture.

Ans Cloning is the latest method of vegetative propagation. In this method, identical offsprings are produced from a single parent using its vegetative tissue or cell. Tissue culture is the technique applied in this method.

(v) Define alternation of generation in plants.

Ans In the life cycle of plants, two different generations alternate with each other. One generation is diploid and produces spores. It is called sporophyte generation. The other generation is haploid and produces gametes. It is called gametophyte generation.

"The phenomenon in which two different generations alternate with each other during life cycle is known as alternation of generations."

(vi) Define Trait. Write two human traits.

Ans "Inheritance means the transmissions of characteristics from parents to offspring. These characteristics are called the traits."

For example, in man, height, colour of the eyes, intelligence, etc. are all inheritable traits.

(vii) Define Monohybrid and Dihybrid Cross.

Ans **Monohybrid:**

A cross in which only one trait is studied at a time, is called as a monohybrid cross.

Dihybrid:

In the next crosses, Mendel studied two contrasting traits at a time. Such crosses are called dihybrid crosses.

(viii) Define Co-dominance and give one example.

Ans **Co-dominance** is the situation where two different alleles of a gene pair express themselves completely, instead of showing a dominant-recessive relationship. As a result, the heterozygous organism shows a phenotype that is different from both homozygous parents.

An example of co-dominance is the expression of human blood group AB.

4. Write short answers to any Five (5) questions: 10

(i) Differentiate between Ecosystem and Biosphere.

Ans "The self-sufficient unit of an environment that is formed as a result of interactions between its biotic community and the abiotic components is known as an **ecosystem.**"

"All ecosystems of the world together form the **biosphere.** It includes all the ecosystems of the planet Earth."

(ii) Define Food Chain. Give one example.

Ans A food chain is a series of organisms within an ecosystem, in which each organism feeds on the one before it and is fed by the one after it.

(iii) What are Biogeochemical Cycles?

Ans Biogeochemical cycles are the cyclic pathways through which materials move from environment to organisms and back to environment.

(iv) Define Biotechnology.

Ans Biotechnology is defined as the use of living organisms in processes for the manufacture of useful products or for services.

(v) Name two basic types of Fermentation.

Ans There are two basic types of carbohydrates fermentation:

1. Alcoholic fermentation (by yeast).
2. Lactic acid fermentation (by bacteria).

(vi) Write two advantages of using Fermenters.

Ans A fermenter optimizes the growth of the organisms by controlling many factors like nutrients, oxygen, growth inhibitors, pH and temperature.

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A fermenter may hold several thousand litres of the growth medium. So, fermenters allow the production of materials in bulk quantities.

(vii) Write two functions of B-Lymphocytes.

Ans B-lymphocytes recognize the weakened or dead pathogens as enemies and start producing antibodies against them. These antibodies remain in blood and provide protection against pathogens. If real pathogens enter blood, the already present antibodies kill them.

(viii) Define Drug.

Ans Any substance that, when absorbed into the body of a living organism, alters normal body function is known as a **drug**. There are many synthetic drugs. *i.e.,* Drugs from plants and fungi, etc.

Part-II

NOTE: Attempt any Three (3) questions.

5.(a) Describe the Mechanism of Breathing. **(4)**

Ans **Mechanism of Breathing:**

The physical movements associated with the gaseous exchange are called breathing. There are two phases of breathing *i.e.,* inhalation and exhalation.

1. Inspiration or Inhalation:

During inspiration, the rib muscles contract and ribs are raised. At the same time, the dome-shaped diaphragm contracts and is lowered. These movements increase the area of the thoracic cavity, which reduces the pressure on lungs. As a result, the lungs expand and the air pressure within them also decreases. The air from outside rushes into the lungs to equalize the pressure on both sides.

2. Expiration or Exhalation:

After the gaseous exchange in the lungs, the impure air is expelled out in exhalation. The rib muscles relax bringing the ribs back to the original position. The diaphragm muscles also relax and it gets its raised dome shape. This reduces the space in the chest cavity and increases the pressure on lungs. The lungs contract and the air is expelled out of them.

Humans breathe 16-20 times per minute in normal circumstance *i.e.,* at rest. The rate of breathing is controlled by the respiratory centre in the brain. The respiratory centre is sensitive to the concentration of carbon dioxide in the blood. When we do exercise or some hard job our muscle cells carry out cellular respiration at greater rate. It results in the production of more carbon dioxide which is released in the blood. This greater than normal concentration of carbon dioxide stimulates the respiratory centre of brain. The respiratory centre sends messages to the rib muscles and diaphragm to increase the rate of breathing so that the excess carbon dioxide present in blood can be removed out of body. During exercise or other hard physical works, the breathing rate may increase up to 30-40 times per minute.

(b) How plants remove metabolic wastes? (3)

Ans **Removal of Metabolic Wastes:**

Plants deposit many metabolic wastes in their bodies as harmless insoluble materials. For example, calcium oxalate is deposited in the form of crystals in the leaves and stems of many plants *e.g.,* in tomato.

In trees which shed their leaves yearly, the excretory products are removed from body during leaf fall.

Other waste materials that are removed by some plants are resins (by coniferous trees), gums (by keekar), latex (by rubber plant) and mucilage (by carnivorous plants and ladyfinger), etc.

6.(a) What are parts of hindbrain and how they perform their function? (4)

Ans **Hindbrain:**

Hindbrain consists of three major parts:

(i) **Medulla oblongata** lies on the top of spinal cord. It controls breathing, heart rate and blood pressure. It also controls many reflexes such as vomiting, coughing, sneezing, etc. Information that passes between spinal cord and the rest of brain pass through medulla.

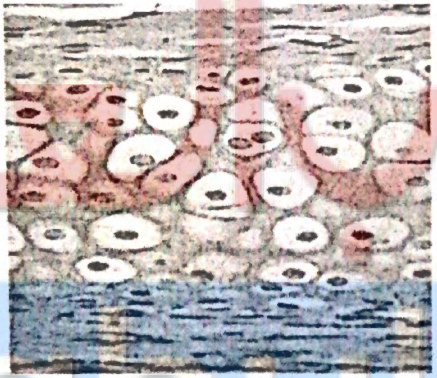
(ii) **Cerebellum** is behind medulla. It coordinates muscle movements.

(iii) **Pons** is present on top of medulla. It assists medulla in controlling breathing. It also serves as a connection between cerebellum and spinal cord.

(b) Describe three types of Cartilage. (3)

Ans "Cartilage is a dense, clear blue-white firm connective tissue (but less strong than bone.)"

There are three types of cartilage:



(i) **Hyaline cartilage** is strong yet flexible. It is found covering the ends of the long bones, in the nose, larynx, trachea and bronchial tubes.

(ii) **Elastic cartilage** is similar in structure to hyaline cartilage. It is also quite strong but has elasticity due to a network of elastic fibres in addition to collagen fibres. It is found in epiglottis, pinna, etc.

(iii) **Fibrous cartilage** is very tough and less flexible due to large number of thick collagen fibres present in knitted form. It is found in intervertebral discs.

7.(a) Explain female reproductive system in rabbit. (4)

Ans The female reproductive system of rabbit consists of ovaries and associated ducts. Ovaries are small oval organs situated in abdominal cavity just ventral to kidneys.

Like most animals, female rabbits have a pair of ovaries. The outer region of ovary produces egg cells. A cluster of specialized cells called follicle surrounds and nourishes each egg cell. From ovaries, egg cells are released in fallopian tubes.

The opening of fallopian tube lies close to ovary. Fertilization occurs in fallopian tubes and the fertilized egg (zygote) is carried to uterus. The uterus of rabbit is divided into two separate parts or horns. The uterus horns join and open into vagina or birth canal. Cervix is the portion of uterus, which separates it from birth canal, where sperms of male are deposited.

(b) What are advantages and disadvantages of vegetative propagation of plants? (3)

Ans Plants can reproduce asexually via vegetative propagation. This method of reproduction has some advantages and disadvantages as well.

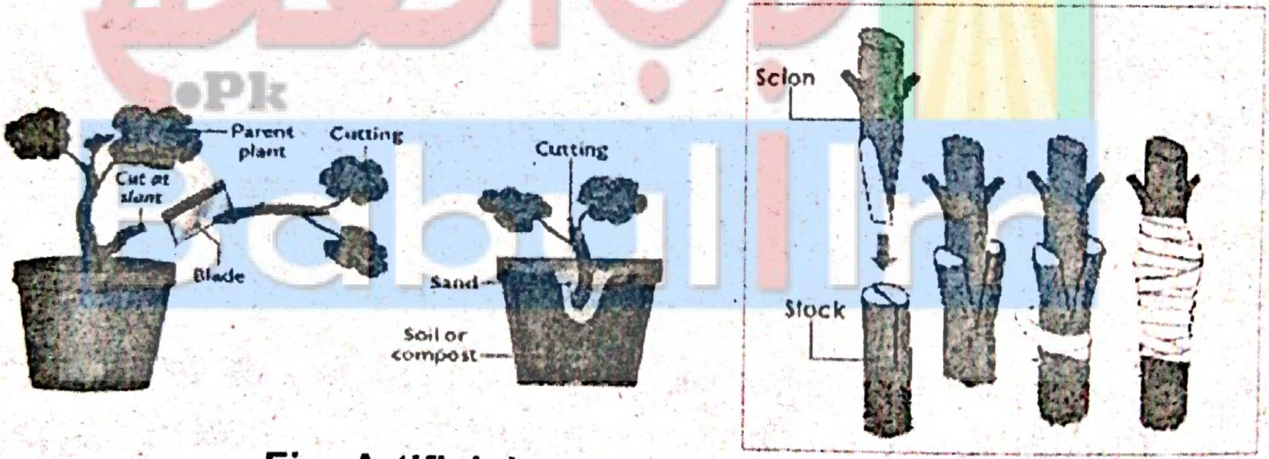


Fig. Artificial vegetative propagation: Cutting (left) and Grafting (right).

Advantages:

The offsprings produced through vegetative propagation are genetically identical. Therefore, beneficial characteristics can be preserved. In vegetative propagation, there is no need of any mechanism of pollination. It helps to increase number of plants at a rapid rate. The organs of vegetative propagation enable many plants to pass over unfavourable conditions. Plants earing seedless fruits can be grown only by vegetative ropagation.

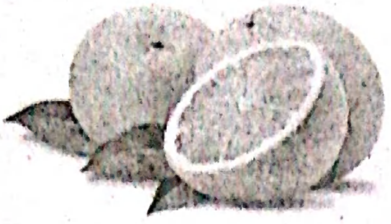


Fig. Product of artificial vegetative propagation: Seedless oranges.

Disadvantages:

The plants do not have genetic variations. Species specific diseases can attack and this can result in the destruction of an entire crop.

8.(a) Define Artificial Selection. Explain it. (4)

Ans **Artificial selection** (or selective breeding) means intentional breeding between individuals for certain traits, or combination of traits. Selective breeding has revolutionized agricultural and livestock production throughout the world. Animals or plants having desirable characteristics are selected for breeding. In this way, many new generations with desirable characteristics are produced. In artificial selection, the bred animals are known as breeds, while bred plants are known as varieties or cultivars.

Numerous breeds of sheep, goat, cow, hen, etc. have been produced by artificial selection to increase the production of wool, meat, milk, eggs, etc.

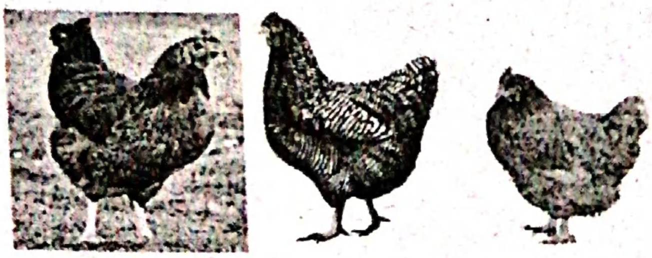


Fig. Breeds of hen produced through artificial selection.

Similarly, many plant varieties (cultivars) have been produced for better quantity and quality of cereals, fruits and vegetables.

(b) Describe types of Ecological Pyramids. (3)

Ans In 1927, Charles Elton (an English ecologist) developed the concept of ecological pyramids. He noted that the animals present at the beginning of food chain are abundant in number while the animals present at the end of food chain are fewer in number.

Ecological pyramid can be defined as,

"A representation of the number of individuals or amount of biomass or energy present in various trophic levels of a food chain."

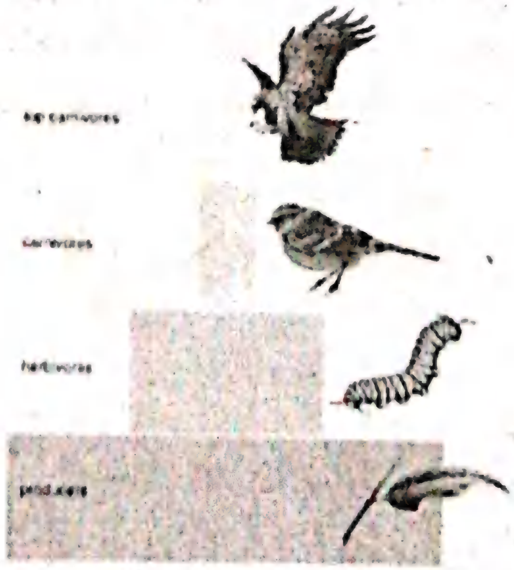
Ecological pyramids are of three types. Here, we will study two of them.

1. Pyramid of Numbers:

It is the graphic representation of the number of individuals per unit area at various trophic levels. Usually, producers are present in large number, primary consumers are in lesser number, secondary consumers are fewer, and so on. So, the producers are of smallest size but maximum in number, while the tertiary consumers are larger in size but lesser in number.

2. Pyramid of Biomass:

It is the graphic representation of biomass present per unit area at different trophic levels. In a terrestrial ecosystem, the maximum biomass occurs in producers, and there is progressive decrease in biomass from lower to higher trophic levels.



9.(a) Write the scope and importance of Biotechnology in the field of medicine. (4)

Ans **Scope and Importance of Biotechnology:**

In recent years, biotechnology is growing as a separate science. It has attracted the attention of many intellectuals from diverse fields like agriculture, medicine, microbiology and organic chemistry. The scope for biotechnology is so wide that it is difficult to recognize the limits. Here we explain in the field of medicine.

Biotechnology in the Field of Medicine:

In the field of medicine, biotechnologists synthesized insulin and interferon (antiviral proteins) from bacteria and released for sale. A large number of vaccines and antibodies, human growth hormone and other medicines have also been produced. Various enzymes are being synthesized for medicinal as well as industrial use. Gene therapy (treatment through genes) has become important in recent years. Biotechnology also proved much beneficial in forensic medicine. The study of DNA helps in the identification of criminals.

(b) Write any three medicinal drugs. Explain in detail. (3)

Ans Various diseases have been made easier to treat by the production of medicinal drugs. Drugs are obtained from the following many sources, but here we explain three of them:

1. Synthetic Drugs:

Such drugs do not occur naturally but are synthesized in laboratory. Pharmaceutical companies produce these drugs *e.g.*, aspirin.

2. Drugs from Plants and Fungi:

Many important medicines are obtained from plants and fungi. These medicines include antibiotics, cardiotonics and certain analgesics. The antibiotic penicillin comes from a fungus. The cardiotonic, known as digitalis, is used to stimulate the heart. It is made from the leaves of purple flowered plant, foxglove.

The pain reliever morphine is made from opium, which comes from the juice of opium poppy plant.

3. Drugs from Animals:

Drugs obtained from animals are usually their glandular products. Fish liver oils, musk, bees' wax, certain hormones and antitoxins are obtained from animal sources.

Part-I

(Practical Part)

NOTE: Attempt any Two (2) questions.

A.(i) Write the procedure of comparison of the breathing rate at rest and after exercise. (3)

Ans This activity will be performed in groups. In each group, one student will act as an observer who will record the observations of other students of the group.

1. Ask the observer to count and record the breathing rate of other students of the group in resting position.
2. Do some light exercise (*e.g.*, walking) for five minutes.
3. Ask the observer to count the breathing rate and again note the observations.
4. After a 15-minute rest, do some strenuous exercise (*e.g.*, running) for five minutes.
5. Ask the observer again to record the breathing rate of the group.

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Students Standing while an observer will note the breathing rate

Students run for some time and the observer will note the breathing rate after they stop running.

Fig. Breathing rate at rest and after exercise.

Table: Breathing Rate

Student No.	At	After Light exercise	After Strenuous exercise
1			
2			
3			
4			
5			
Average			

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Compare all these observations and interpret the results.

(ii) Define the term inhalation. (2)

Ans "Phase of breathing in which air is drawn into the lungs is called **inhalation**."

B.(i) Draw and label the observed diagram of structure of bone. (3)

Ans

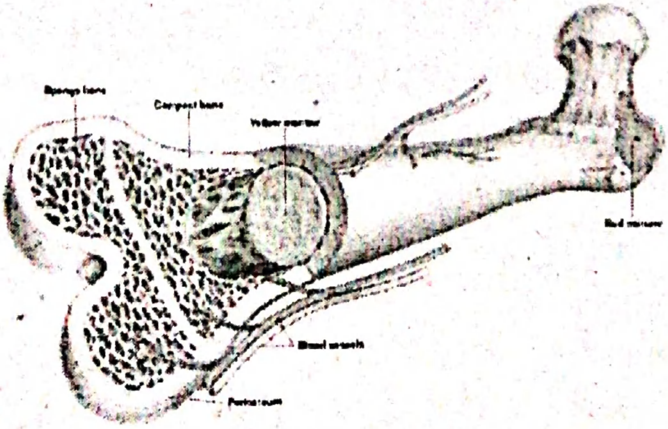
Spongy bone
Compact bone
Yellow marrow
Red marrow
Blood vessels
Periosteum

Fig 13.1: Structure of a bone.

(ii) Define Compact Bone. (2)

Ans "The hardest layer of the bone, on the outside, is called compact bone."

C.(i) Draw and label the diagram observed of structure of Rhizome of ginger. (3)

Ans

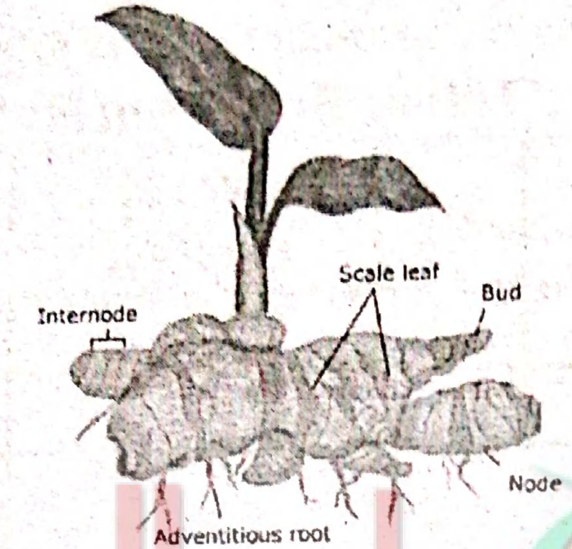

Fig 14.5: Rhizome of ginger.

(ii) Write two advantages of vegetative reproduction in plants. (2)

Ans **Vegetative reproduction:**

Following are the two advantages of vegetative reproduction:

1. It can occur by leaves cutting.
2. The transfer of pollen grains from the anther to the stigma of the same flower of the same plant takes place.

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